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Manual DDS

EN

Operating Instructions

Wet grinding module (DS2000 / DS2100)

valid from September 2014

This documentation is valid from September 2014
ver1442

Contents

1 Legend

1.1 Explanation of safety message text

General warning text. Failure to comply with the information given in this text can lead to serious injury.

⚠ CAUTION

Nature and source of a hazardous situation

Possible consequences!

➤ Advice to avoid the hazardous situation

1.2 Classification of signal words

⚠ DANGER DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.

⚠ WARNING WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.

⚠ CAUTION CAUTION indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

NOTICE NOTICE is used to address practices not related to physical injury. It indicates situations that can lead to material damage of the product or the environment.

1.3 Symbols and Hints

ⓘ background information

■ list

Link / cross reference

Important — Operating instructions and other important information

Hint — Information to make work easier

1.4 Instruction symbols

★ requirement

M 1. first action (M stands for manually)

S 2. second action in the software (S stands for Software)

M 3. third action (M stands for manually)

➨ result

2 General safety messages

2.1 Supplemental directives

Read this manual before you start the module. Follow the listed safety messages to avoid risks and possible major injuries.

The user has to be informed about the intended use of the wet grinding option. The safety messages indicated in this document have to be followed (page 10).

Check the module and especially the protective devices for possible damages. Damaged safety devices or parts thereof must, if not stated otherwise in the user manual, be repaired or replaced by authorised service personnel.

Follow the safety messages in the operating instructions of your CNC machine. When using the wet grinding module the safety messages in these operating instruction also apply **additionally**.

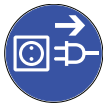
Keep children and animals away from the module. Do not let the module run unattended unless you meet the specified requirements (page 10).

Important

After multiple hours of grinding, droplet formation may occur outside the housing. This is normal and no fault in the machine. Remove the liquid immediately. Always check all hoses for leaks and make sure that they are tightly installed.

2.2 Safety messages

⚠ DANGER

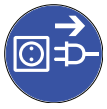



Use of damaged cables

Danger to life due to an electric shock!

- ➤ Disconnect the machine from any electrical source and prevent the machine from being restarted.
- ➤ Contact the service department.
- ➤ Replace damaged cables only with original spare parts.

⚠ DANGER




Troubleshooting while the machine is running

Danger to life due to an electric shock!

- ➤ Consult the service department before you clear the malfunction on your own.
- ➤ Disconnect the machine from any electrical source and prevent the machine from being restarted.

⚠ DANGER

Using the wet grinding module without a residual current protective device (RCD)

Danger to life due to an electric shock!

- ➤ When using the wet grinding module a residual current protective device (RCD) must be installed in the electric circuit of the CNC machine and the wet grinding module.
- ➤ If you cannot provide a current protective device, contact customer support. They can provide you with a special power supply “wet grinding option RCD”.

⚠ DANGER

Wrong installation of water-bearing hoses

Danger to life due to an electric shock!

- ➤ Make sure that the water-bearing hoses are not installed above electric cables or electric devices to prevent leaking water from coming into contact with electric cables.

⚠ WARNING

Using the wrong cooling lubricant

Danger to health!

- ➤ **Only** use the cooling lubricant that is recommended by DentaSwiss.

⚠ CAUTION

Disorder in the working environment

Tripping hazard!

- ➤ Keep the working environment clean.
- ➤ Store the wet grinding module in a safe place.
- ➤ If you have installed the rolls to the wet grinding module, always activate the roll brakes when the module is not being moved.

⚠ CAUTION

Leaking liquid at the working environment!

Slip hazard!

- ➤ Keep the working environment clean.
- ➤ Wipe up leaking liquid immediately.

⚠ CAUTION

Skin contact with the cooling lubricant

Skin reddening or skin irritations!

- ➤ Wash the skin after it has come into contact with the cooling lubricant or the water emulsion.

⚠ CAUTION

Drinking the cooling lubricant

Sickness and diarrhoea!

- ➤ Store the cooling lubricant only in labelled containers to prevent it from being confused with food.

⚠ CAUTION

Putting down the module insert

Crushing hazard!

- ➤ Always use both handles to put on the module insert.
- ➤ Make sure that no other person's fingers get pinched when putting on the module insert.

2.3 Intended use of the module

The wet grinding module may only be used together with the DS-2000 and the DS-2100 from DentaSwiss. You may only process the grinding materials and block sizes that you can chose in the DentalCAM software.

When using the wet grinding module an obligatory residual current protective device (RCD) must be installed in the electric circuit of the CNC machine and the wet grinding module.

If you have installed the rolls to the wet grinding module, activate the roll brakes when the module is not being moved.

If you use the device for a different purpose than the one previously described, it can be damaged. The protective devices **must not** be **avoided** or **turned off**.

Part of the intended use is also to follow these operating and maintenance instructions.

If you use the standard power supply of the wet grinding module, the liquid connection of the CNC machine must be positioned at the bottom of the connection panel (4.5). Otherwise use the power supply “wet grinding option RCD”, which will be provided by customer support.

The wet grinding module may only be used with the CNC machines that were assigned at the delivery of the wet grinding module.

The machine may only be operated with original equipment from DentaSwiss to keep up the safety of the product and the warranty of the machine. The user carries the risk of damage to the machine if non-authorised equipment is used.

Only use the wet grinding module together with the cooling lubricant that is recommended by DentaSwiss. Regard the corresponding disposal information for the water emulsion (page 39).

The claim for benefits expires if you modify the machine or take off the control housing without a written agreement of the DentaSwiss service department!

The wet grinding module may run unattended. Note the requirements for the unattended operation of your CNC machine and the information about the operation of the wet grinding module.

2.4 Transportation and storage

- Always transport the module in an upright position.
- The wet grinding module has to be transported individually at all times. Several modules may not be piled up.
- If the rolls are installed, roll the wet grinding module on the floor. To carry the module insert, grip the module insert at the handles. If the liquid con-

tainer is filled, take it out of the housing and carry it separately. You can grip the housing separately between the rolls/housing feet.

- The ambient temperature for storage and transport of the machine has to be between 10 °C and 35 °C.
- When storing the used wet grinding module, remove all liquid from the liquid container and from the fine filter tank (page 35). You can store the housing and the module insert separately.

NOTICE

Always store the module insert in an upright position, because otherwise the support leg can break off.

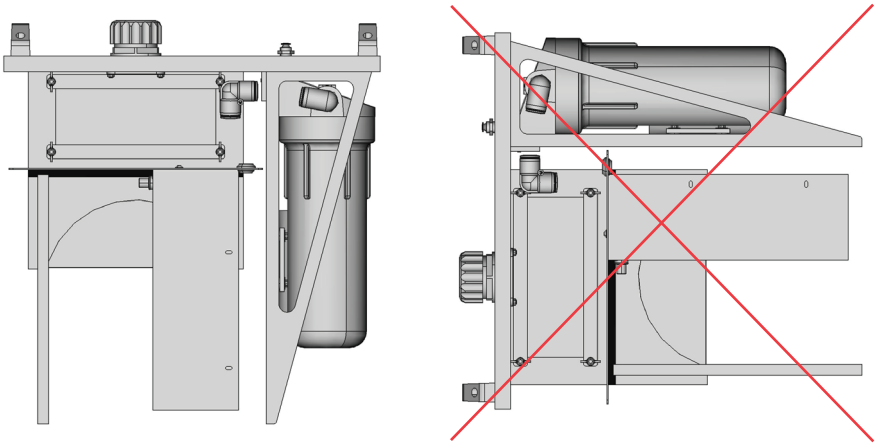


Illustration 1: Storage module insert

3 Module description

3.1 About these instructions

These instructions for use allow you to use the wet grinding module from the DentaSwiss company as well as the corresponding accessory equipment safely and reliably. Accordingly, we request you to read this manual attentively and to follow the advice given.

Important

Keep these instructions near the wet grinding module and ensure that everybody who is working with the machine has access to this manual.

ⓘ We appreciate every feedback and suggestion for improvement so that we can continuously improve our product and the associated documentation. If you have questions or suggestions, please refer directly to your reseller.

3.2 Module components

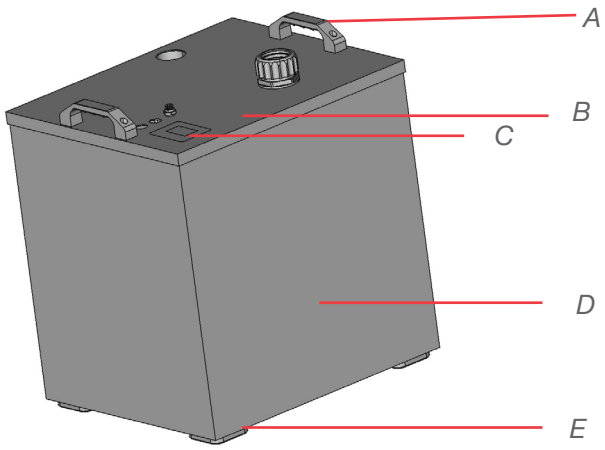


Illustration 2: Wet grinding module components

A: Handles
B: Module insert
C: Display
D: Housing
E: Housing foot / Rolls

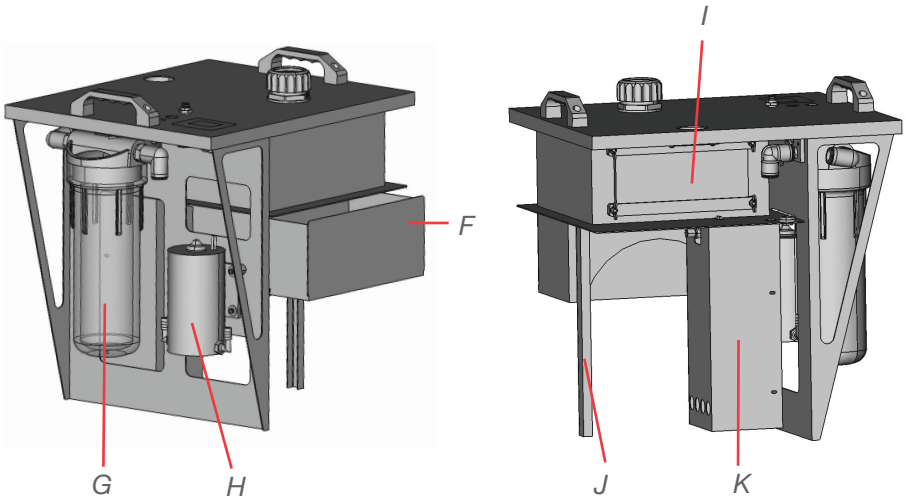


Illustration 3: Module insert components

F: Coarse filter drawer
G: Fine filter tank
H: Membrane pump
I: Flat fold filer
J: Support leg
K: Measuring station

3.3 Technical data

3.3.1 Base system

- Dimensions with housing feet (W/D/H): ca. 382 x 455 x 510 mm
- Dimensions with rolls (W/D/H): ca. 382 x 455 x 570 mm
- Empty weight of the module: ca. 31 kg
- Separation of the suction mixture from the grinding dust and the moisture
- Coarse filter drawer for rough dirt
- Removable liquid container
- Labyrinth air guiding system
- All metal parts made of stainless steel
- Ultrasonic sensor for measuring the liquid level
- Power supply with an output voltage of 24 V DC, 60 W
- Input voltage of the membrane pump: 1A

3.3.2 Controller

- Integrated RGB display
- Option to automatically control the membrane pump via software
- Integrated operation counter
- Display of the liquid level in percent
- Deactivation of the membrane pump when the liquid level is low

3.3.3 Filter

- Coarse filter mat for rough dirt
- Additional flat fold filter to protect the air extraction
- Fine filter cartridge with a pore size of 5µm

3.3.4 Cooling lubricant

- Mix ratio with water 1:20 (5% solution)
- pH value of 9,5

3.4 Scope of delivery

Illustration 4: Scope of delivery wet grinding option

A: 1 control cable for membrane pump

*B: 1 standard power supply**

C: 1 power supply cord

D: 1 bottle of cooling lubricant

E: 3 Fine filter cartridges

F: 3 coarse filter mats

G: 1 Liquid hose

H: 3 front cover seals

I: 1 mounting wrench for filter change

J: 1 container of pH testing strips

K: 1 metal closing plug

L: 1 set of rolls

M: 1 connecting hose

* Alternatively: Power supply “wet grinding option RFC”. Also sold separately. Contact customer support for more information.

Further scope of delivery (not depicted)

- Instructions for use of the wet grinding option
- Quick reference guide for the software extension of DentalCAM 5
- Cleaning brush
- Measuring cup

- 3 front cover plugs
- Hexagon screw driver for clamping the blank holder
- Protective cap for vacuum sensor (to be installed by a service technician)

3.5 Sound emission

ⓘ The sound emission varies heavily depending on the manufacturing material and the grinding conditions. Change the grinding conditions if the machine is too loud. Ensure that the workpiece is fixed properly, and check the condition of the tool and the material you use.

If loud noises can not be avoided, wear ear protection during processing.

Measuring conditions:

- Processed material: VITABLOCS Mark II
- Tool worn out
- Measuring distance to sound source: 1 m
- Air extraction activated on the highest power level
- Wet grinding module activated
- Measurement according to ISO 3746, engineering method 3

Operating condition	Maximum A-weighted sound pressure level	Maximum A-weighted sound power level
Grinding (measuring conditions see above)	81 dB(A)	95 dB(A)
all other operating conditions (tool change, movement of the axes etc.)	<70 dB(A)	<70 dB(A)

4 Installation

DANGER

Using the standard power supply of the wet grinding module with CNC machines whose liquid connection is at the top

Danger to life due to an electric shock!

If the liquid connection of your CNC machine is positioned at the top of the connection panel and you use the standard power supply of the wet grinding module, water can get into contact with live parts.

In case your wet grinding option came with the standard power supply:

- **Before installing** the wet grinding module, check the connection panel of your CNC machine (4.5).
- If the liquid connection on your CNC machine is positioned at the top of the connection panel, **do not install** the wet grinding module and contact customer support. They will provide you with a special power supply “wet grinding option RCD” together with additional instructions.

Illustration 5: Left: Liquid connection at the top, right: Liquid connection at the bottom

⚠ DANGER

When using the wet grinding module a residual current protective device (RCD) must be installed in the electric circuit of the CNC machine and the wet grinding module.

4.1 Connections on the CNC machine and the wet grinding module

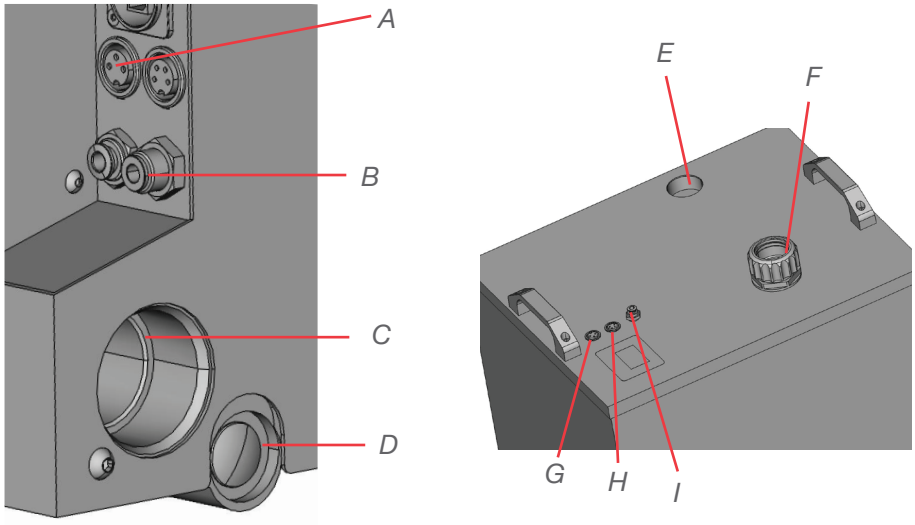


Illustration 6: Connections CNC machine (left) and wet grinding module (right)

A: Switching output for the membrane pump

B: Liquid hose connection for the membrane pump, Ø 6 mm, max. pressure 3 bar

C: Air extraction connection

D: Liquid drainage

E: Connection for vacuum hose

F: Connecting hose connection

G: Power supply connection

H: Control port for membrane pump

I: Liquid hose connection

4.2 Placement requirements

The following requirements have to be met for the right module location:

- Firm and even surface; has to carry the weight of the module
- Room temperature ideally between 18° Celsius and 25° Celsius, maximum room temperature 32° Celsius
- Height of the location up to 2000 metres above mean sea level
- Relative air moisture maximum 80 %, non-condensing
- Alternating current source with 100 – 240 V and 50 – 60 Hz
- The room where the module is placed should be well-ventilated because moist air is emitted to the air.

4.3 Installing the rolls

ⓘ The wet grinding module comes with housing feet installed as standard. DentaSwiss recommends installing the rolls if you place the wet grinding module on the floor. With that you can access the module more easily when refilling the liquid or changing filters.

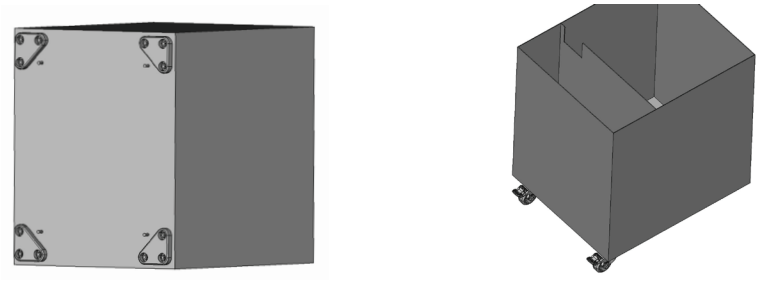


Illustration 7: Installing the rolls

M1. Remove the module insert and liquid container from the housing.

M2. To access the bottom side more easily, lay the housing on its side.

M3. Remove the nuts and the housing feet.

M4. Install the rolls instead of the housing feet. Make sure to install the 2 rolls with the built-in brakes at the front.

M5. Fix each roll with 4 washers and 4 nuts.

Important

Make sure to always activate the roll brakes unless the module is being moved.

4.4 Placing the module

⚠ DANGER

Make sure that no electric devices are placed under the wet grinding module. Do not install any water-bearing hoses above electric cables or electric devices.

Important

Only connect original cables from DentaSwiss to the wet grinding module.

ⓘ To prevent a loss of air extraction, the connecting hose may not be longer than 1.5 meters. This limits the distance between the CNC machine and the wet grinding module.

M1. Unwrap the module. Please keep the packaging for possible further service shipments.

M2. Place the module at the desired location. Possible ways to place the module are depicted on the following illustrations.

Important

The connecting hose connection may not be placed higher than the air extraction connection of the CNC machine.

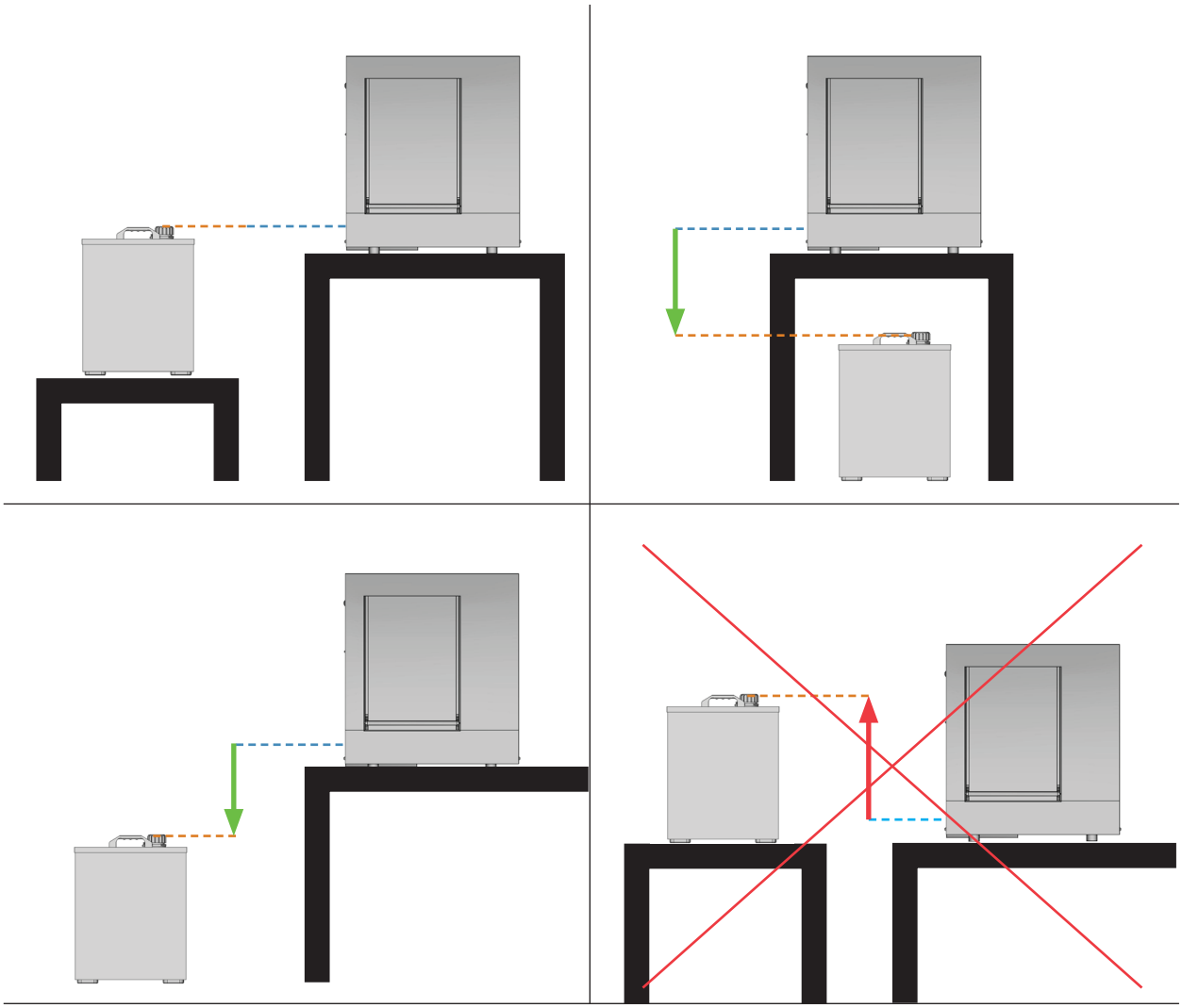


Illustration 8: Positioning possibilities wet grinding module

4.5 Installing permanent components

Important

You can keep the connections to the CNC machine described in this chapter also during dry processing.

4.5.1 Installing the control cable, liquid hose and metal closing plug

M 1. Install the components with the help of the following table. The letters designating the connections refer to the connection diagram (4.5).

Component	Connection CNC machine	Connection wet grinding module	Image
Control cable	Switching output for the membrane pump (A)	Switching input for membrane pump (H)	
Liquid hose	Liquid hose connection (B)	Liquid hose connection (I)	
Metal closing plug	Liquid drainage (D)	-	

4.5.2 Installing the front cover seals

M1. Open the front cover.

M2. Insert the 3 front cover seals into the 3 openings in the front cover as shown in the following illustration.

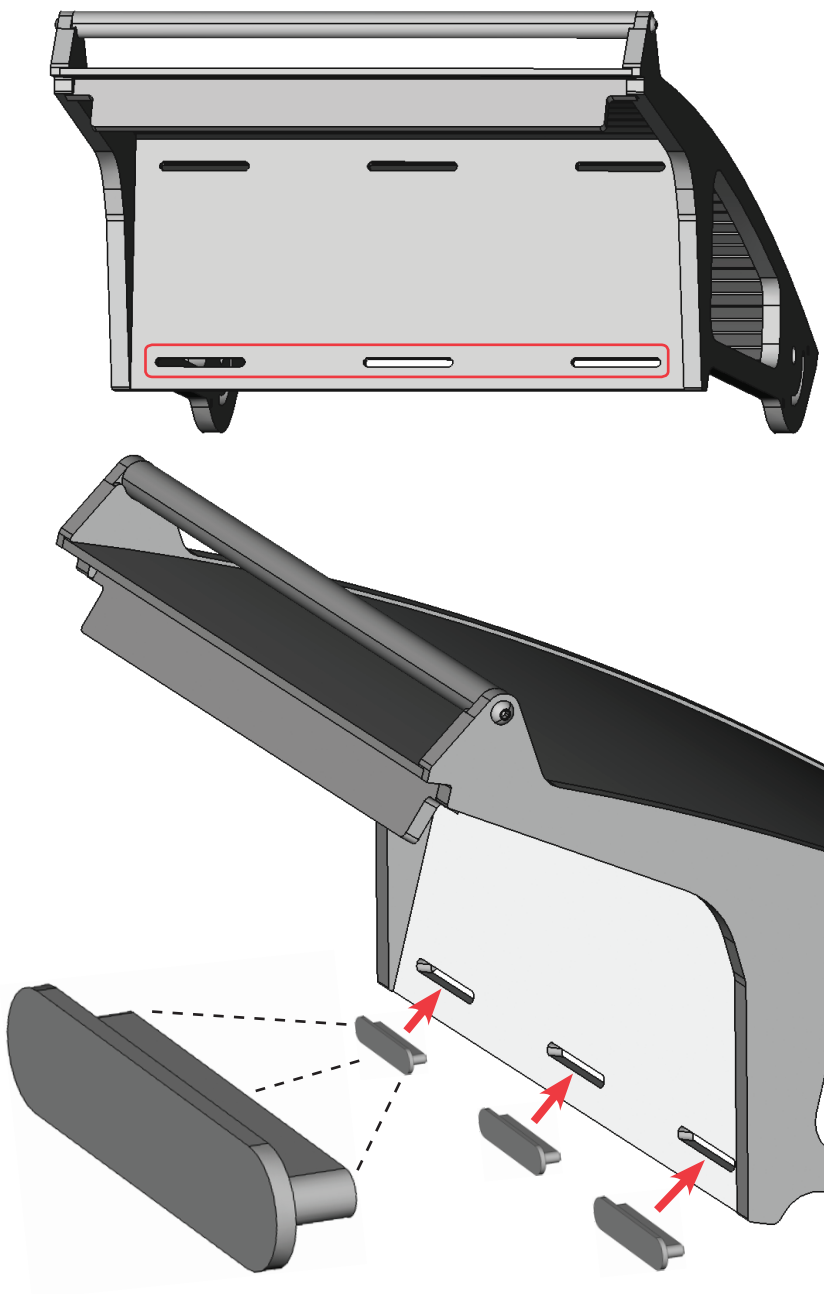


Illustration 9: Installing the front cover seals

4.6 Installing the connecting hose

Important

The connecting hose should not sag because otherwise liquid will collect in the hose, which will decrease the air extraction.

4.6.1 Checking the length of the connecting hose

M1. To check the length of the connecting hose connect it to the CNC machine and then hold it close to the connecting hose connection of the wet grinding module.

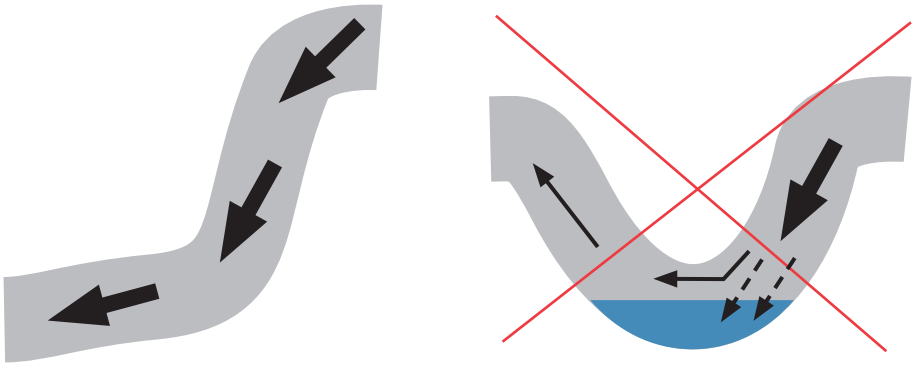


Illustration 10: Connecting hose in operation

M2. Check if the hose sags.

➥ If the connecting hose does not sag, install it (chapter 4.6.3). Otherwise shorten the connecting hose.

4.6.2 Shortening the connecting hose

★ The connecting hose sags.

M1. Memorize the spot where the connecting hose reaches the connection of the wet grinding module. Add 3 cm of length and mark this spot.

M2. Cut the connecting hose at the marked spot with a sharp knife.

M3. Connect the connecting hose to the wet grinding module.

4.6.3 Fixing the connecting hose to the wet grinding module

M1. Unscrew the screwed hose connection of the wet grinding module.

M2. Stick the connecting hose through the screwed hose connection with a distance of about 3 cm (Illustration 11). Make sure that the white sealing ring does not fall out.

Illustration 11: Fixing the connecting hose

M3. Hold the connecting hose with one hand and tighten the screwed hose connection with the other hand.

4.7 Filling the liquid

★ The module insert is disconnected from the electrical source.

M1. Remove the module insert.

M2. Remove the liquid container.

M3. Fill in 14.25 litres (liquid level ca. 173 mm) of tap water into the liquid container.

M4. Add 0.75 litres of cooling lubricant.

➨ You have a 15 litre emulsion of water and cooling lubricant with a mixing ratio of 5 %.

M5. Reinsert the liquid container.

M6. Reinsert the module insert.

M7. Connect the power supply to the wet grinding module and the electrical source.

➨ The wet grinding module is ready for use.

5 Running the module

NOTICE

Use the wet grinding module always with **activated air extraction** to prevent damage to the CNC machine. Put the vacuum cleaner always on the **highest power level** during wet processing.

Important

DentaSwiss recommends not to exceed **an average time of 2 hours per day** of grinding operations. You can run the wet grinding module longer than that, but with frequent wet processing the lifetime of wear parts like the spindle bearings and the membrane pump decreases! The membrane pump is designed to run 1000 hours.

5.1 Change from dry processing to wet processing

★ The wet grinding module is ready for use and there is enough liquid inside the wet grinding module.

M1. Clean the working chamber of the CNC machine completely.

M2. Remove the vacuum hose from the CNC machine.

M3. Insert the vacuum hose into the wet grinding module.

M4. Insert the connecting hose into the CNC machine.

5.2 Inserting the block holder for round mandrels (DS-2000/DS-2100)

M1. Insert the grinding block with the groove pointing upwards into the block holder all the way.

M2. Tighten the screw.

M3. DS-2000: Insert the block holder as pictured into the working chamber of the CNC machine.
DS-2100: Insert the block holder into the blank changer like a blank frame.

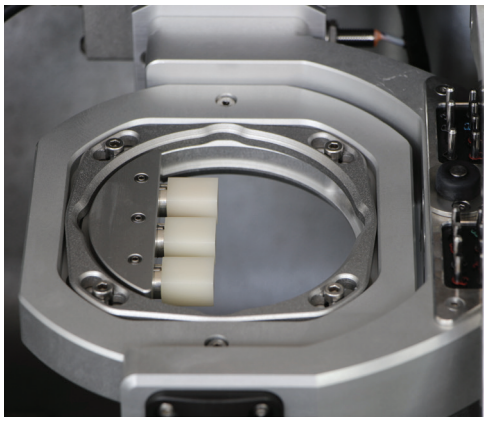


Illustration 12: Block holder inserted in the working chamber (DS-2000) / Block frame

5.3 Tools

Hint

Usage of original tools is recommended since the tools are designed by DentaSwiss especially for the machine and the designated operation.

NOTICE

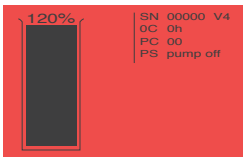
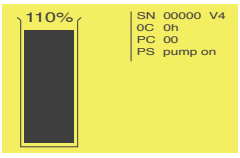
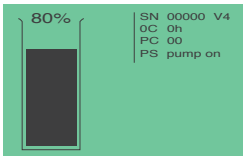
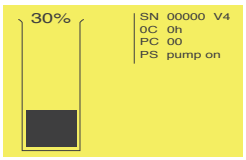
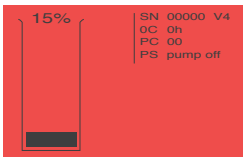
| Only use tools that are set and selectable in the processing software.

5.4 Display

The display shows you all important data of the wet grinding module at a glance. Besides the liquid level the display shows the operating hours of the wet grinding module, the version of the control unit, how often the membrane pump has been activated and the state of the membrane pump.

Hint

A difference of 10 % on the display equals a difference of 1 litre liquid.

Liquid level in % / height in the liquid container	Background lighting	Effect	Exemplary picture
> 120 % > ca. 200 mm	red blinking	Membrane pump doesn‘t start	
120 -101 % ca. 200 - 180 mm	yellow		
100 - 41 % ca. 180 mm - 110 mm	green	-	
40 - 16 % ca. 110 mm - 80 mm	yellow	Interval audio warning below 30%	
15 % ca. 80 mm	red	Membrane pump stops, constant audio warning	

5.5 DentalCNC

5.5.1 First start

While starting the wet grinding module for the first time or after replacing the fine filter cartridge activate the membrane pump by clicking the corresponding icon in the CNC software so that residual air can pass out of the system (Illustration 13). Leave the membrane pump activated until liquid comes out of the spindle nozzles.

Important

If you received a wet grinding option for an existing CNC machine the software will request to unlock the wet grinding option. If you didn't receive the unlocking code, refer to your reseller.

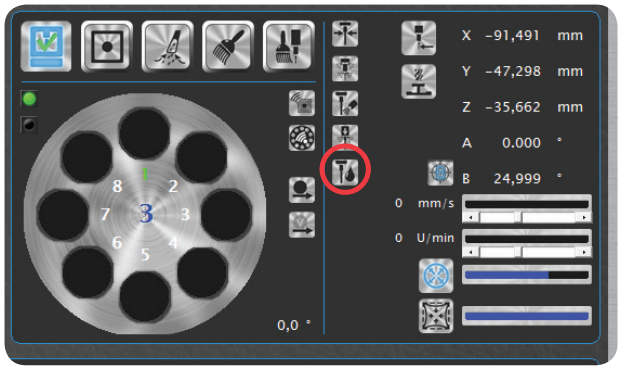


Illustration 13: Activation of membrane pump

5.5.2 Wet processing

Once you created a production job for wet processing, make sure that the button for the wet grinding module is activated in the respective job (Illustration 14). The software then controls the wet grinding module automatically.

ⓘ DentalCAM activates this button automatically for materials that need to be processed wet (e.g. ceramic materials).

Illustration 14: Activation of an automatic wet processing

5.6 Change from wet processing to dry processing

NOTICE

Moist air or residual liquid in the working chamber of the CNC machine can reach the electrical parts of the CNC machine and condensate! Therefore activate the air extraction during wet processing and afterwards. Leave the front cover open, if you don‘t continue working with the machine.

S 1. Activate the air extraction so that as much liquid as possible is removed from the working chamber.

M 2. Open the front cover of the CNC machine.

M 3. Take the block holder out of the CNC machine.

M 4. Remove the residual moisture from the working chamber with a wet vacuum or a cloth.

M 5. Remove the connecting hose from the CNC machine.

M 6. Remove the vacuum hose from the wet grinding module.

M 7. Insert the vacuum hose into the CNC machine.

➨ You can continue with dry processing.

6 Maintenance and cleaning

6.1 Refilling the liquid

★ The display has changed its colour because of too little liquid.

⚠ DANGER

Disconnect the wet grinding module **always** from the electrical source before you take off the module insert.

M1. Disconnect the wet grinding module from the electrical source.

M2. Remove the module insert from the housing and put it in an upright position on the floor or on a table.

Hint

Check the degree of pollution of the filter mat and the fine filter cartridge every time after removing the module insert.

M3. Measure the pH value of the water emulsion (once per week is enough).

M4. If the pH value is below 9, add water emulsion containing water and 5% cooling lubricant until there are 15 litres (liquid level ca. 180 mm) in the liquid container.

M5. If the pH value is between 9 and 9.5, add tap water to the liquid container until there are 15 litres in the liquid container.

6.2 Coarse filter and liquid container cleaning

★ The module insert is disconnected from the electrical source and removed from the housing.

M1. Take out the coarse filter drawer and dispose the residual material.

M2. Wash out the coarse filter mat.

M3. You can reuse the coarse filter mat as long as the pores are not blocked and liquid can still pass through.

M4. Insert the cleaned coarse filter mat or a new coarse filter mat into the coarse filter drawer.

M5. Clean the liquid container with a cloth.

⚠ CAUTION

Wash the skin after it has come into contact with the cooling lubricant or the water emulsion.

M6. Reinsert the coarse filter drawer.

6.3 Fine filter cartridge change

★ The module insert is disconnected from the electrical source and removed from the housing.

M1. Place the module insert in an upright position next to a table edge.

M2. Take the mounting wrench for filter change and screw out the fine filter tank clockwise.

M3. Dispose the liquid out of the fine filter tank.

M4. Remove the fine filter cartridge and dispose it.

M5. Clean the fine filter tank if it is polluted.

M6. Insert a new fine filter cartridge.

M7. Add tap water into the fine filter tank (until ca. 10 mm below the rim).

M8. Make sure, that the fine filter cartridge is centred and screw in the fine filter tank tightly.

S9. Activate the membrane pump with the help of the software until liquid exits from the spindle nozzles (page 30).

6.4 Flat fold filter cleaning

★ The module insert is disconnected from the electrical source and removed from the housing.

M1. Place the module insert in an upright position on the floor or on a table.

M2. Remove the 4 butterfly nuts around the flat fold filter.

M3. Take off the 2 rails and take out the flat fold filter.

M4. Clean the flat fold filter and the opening of the labyrinth air guiding system with a vacuum cleaner.

6.5 Complete liquid change

★ The module insert is disconnected from the electrical source and removed from the housing.

M1. Take out the liquid container.

M2. Dispose the remaining water emulsion.

⚠ CAUTION

Wash the skin after it has come into contact with the cooling lubricant or the water emulsion.

M3. Clean the liquid container.

M4. Reinsert the liquid container.

M5. Fill the liquid container (page 26).

6.6 CNC machine cleaning

M1. Activate the air extraction.

M2. Open the metal closing plug at the side of the CNC machine.

M3. Remove the residual liquid in the working chamber.

M4. Clean the liquid drainage at the right side and at the left side in the lower part of the working chamber with the cleaning brush.

6.7 Maintenance table

Component	Recommended interval	Procedure/Utensils	Prerequisites/ Comments
Liquid container	when display shines yellow	Tap water (page 33)	
Measuring the pH-value	once a week	Tap water, possibly cooling lubricant (page 33)	
Coarse filter cleaning	as necessary	(page 34)	
Fine filter cartridge change	as necessary	Mounting wrench for filter change (page 34)	Liquid pressure in the CNC machine drops
Flat fold filter cleaning	as necessary	Vacuum cleaner (page 34)	Air extraction decreases
Complete liquid change	as necessary, at least once in 6 months	(page 35)	
CNC machine cleaning	after 10 operating hours of the wet grinding module	Cleaning brush (page 35)	
Membrane pump change	after 1000 operating hours of the wet grinding module	-	Membrane pump change has to be executed by a service technician.

6.8 Module maintenance

ⓘ DentaSwiss recommends to perform a complete machine maintenance regularly by a service technician. A module maintenance should be performed at least every two years.

Important

If there is permanent use of the machine (shift operation), frequent wet grinding or dust in the surrounding air, the module maintenance should be done every year. It is recommended to perform a module maintenance whenever the machine is repaired.

7 Disposal

7.1 Disposing the water emulsion

The product contains neither PCB nor other chloroparaffins.

Important

Avoid liquid entry of new or used water emulsion into the soil, in waters or into the canalisation.

Hint

Recycle or incinerate the water emulsion at approved facilities. Transfer it to approved disposal companies. A reference sample of the disposal product shall be kept at your place for at least 6 months.

Waste code number: 120109 Machining emulsions and solutions free of halogens

Burden of proof: Yes

Please regard the national and the local laws of the disposal location in any case.

7.2 Disposal of the wet grinding module

Disposal of the module is taken over cost-free by DentaSwiss. The user bears the costs for disassembly, transport and packaging of the module. Contact DentaSwiss before sending in the module to go through the further procedure.

Please regard the national and the local laws of the disposal location if you dispose the module on your own.

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